

Lightweight 155mm Howitzer & Towed Artillery Digitization



155 Lethality for Early Entry Forces

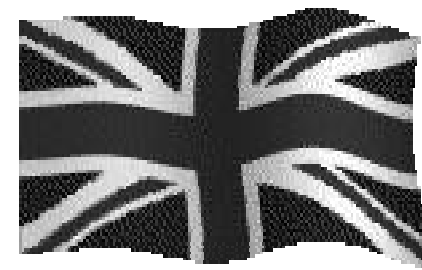
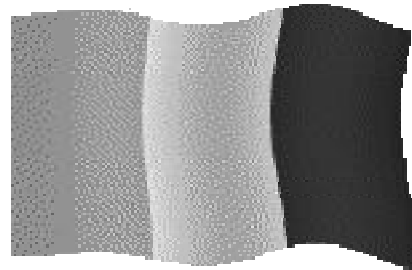
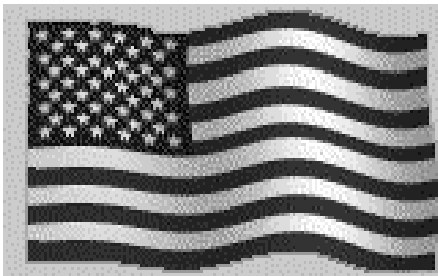




Allied Involvement in LW155 Development



The Future of Towed Cannon Artillery



- Italy and United Kingdom
- Both Provide Supplemental Funding.
- Selected for Allied Commando, Marine & Alpine Artillery



XM777 – TAD System



The Future of Towed Cannon Artillery

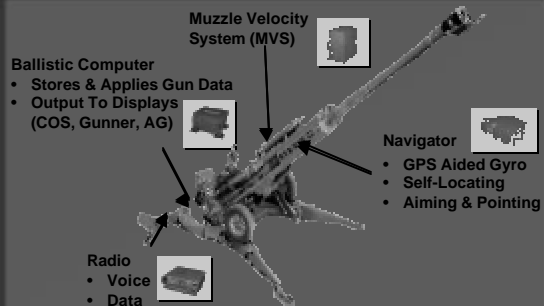
XM777 Howitzer



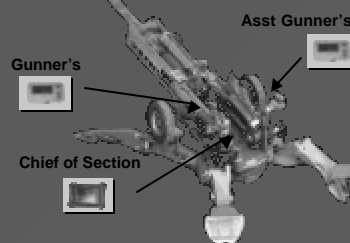
- Lightweight High-Strength Titanium
- Improved Ground Mobility
- Improved Strategic Deployment
- Improved Survivability

**Harder to Find,
Harder to Hit,
Harder to Kill!!**

Towed Artillery Digitization



Displays



- Dispersed – Flexible Operations
- No Survey
- Improved Accuracy
- More Responsive

(Representative Hardware Only)



XM777

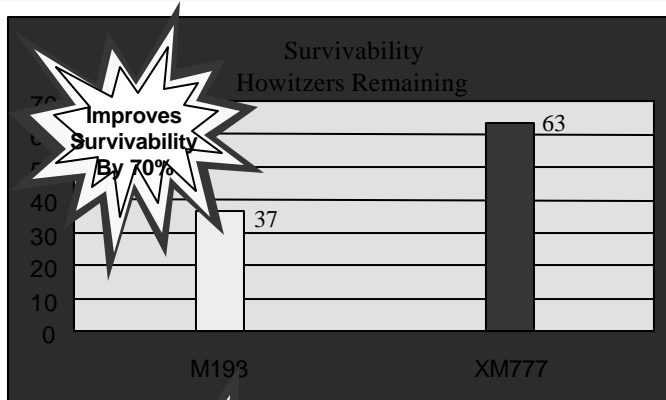




Harder to Find, Harder to Hit, Harder to Kill!!

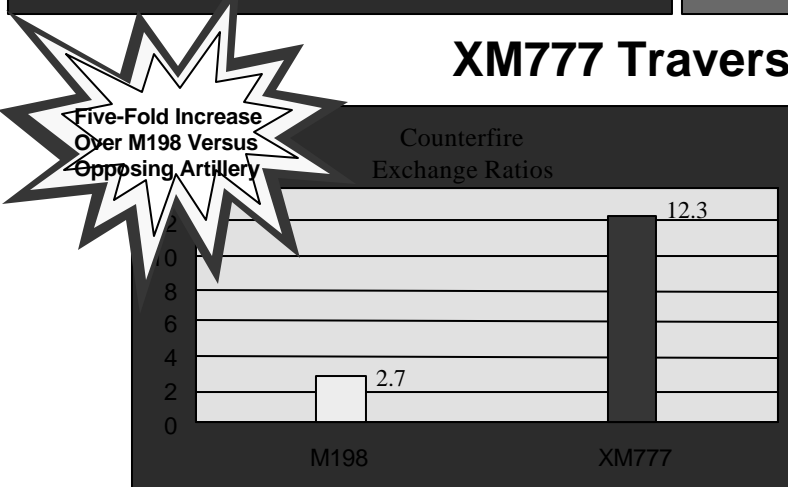
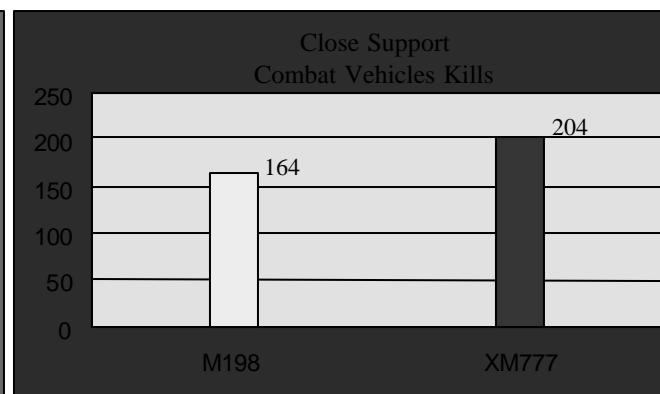


The Future of Towed Cannon Artillery

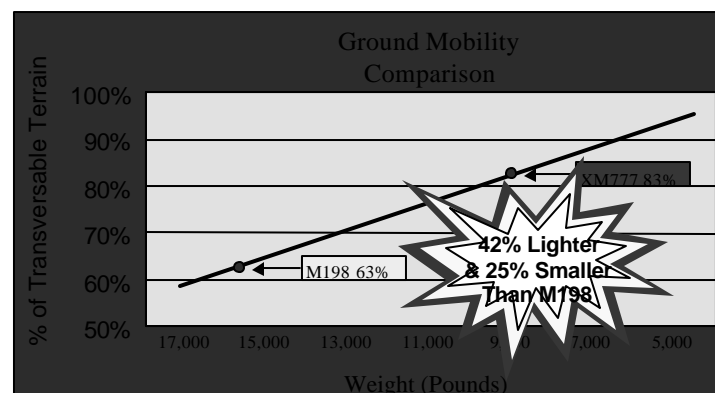


XM777 Platoon

**Emplaces
3 Minutes
Displaces
2 Minutes
Moves
1-4 Per Hour**



XM777 Traverses 32% More Terrain



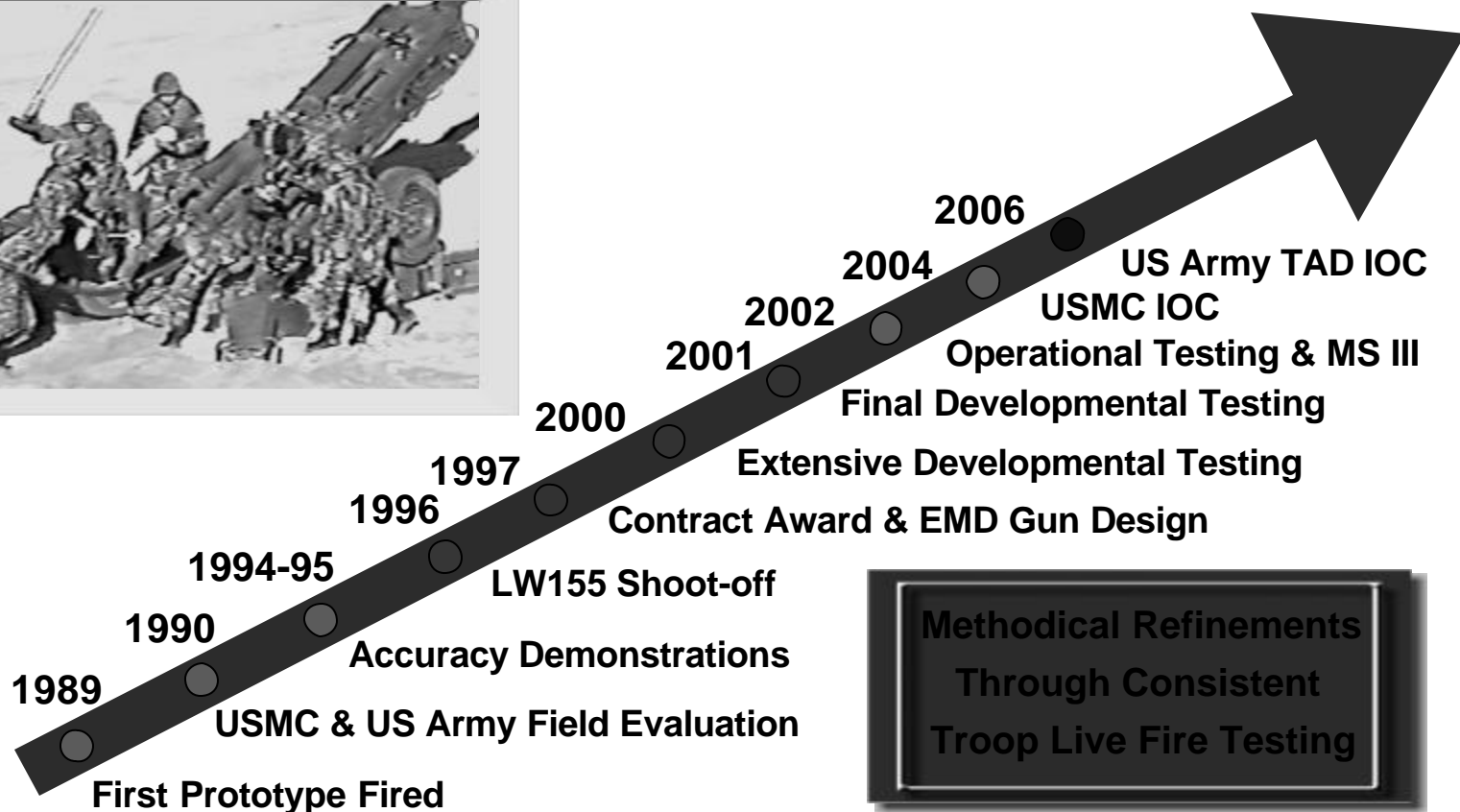
All Data Shown is from 1995 COEA 'AMSAA' Scenario: SWA, NEA and Europe
06-20-01 NDIA



Program Evolution



The Future of Towed Cannon Artillery





Spade Design



The Future of Towed Cannon Artillery

Shoot-Off Design

- Insufficient Area -Excessive Rearward Movement
 - Lost Aiming Reference
- Exceeded Displacement Time (KPP)



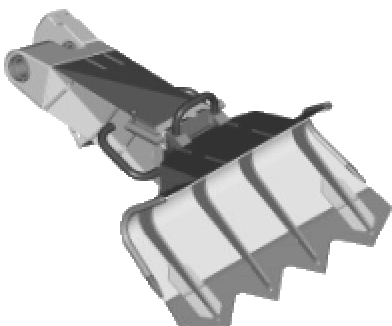
Initial EMD Design

- Emplacement Time Issue: 12" Dig Required
- Displacement Time OK: Spade Latch
- Strength Issue in Very Hard Soil



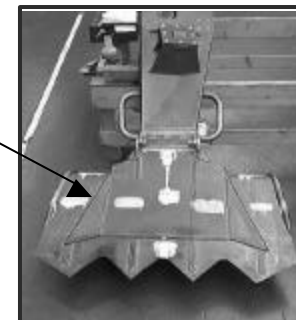
- 863 Rounds Fired – No Cracks or System Aborts

EMD Design



- Emplacement Time OK: 6" Dig Design
- Displacement Time OK: Robust Spade Latch
- Increased Blade Area: Retains Aiming Reference
- Delivered on 1003 – 1010: Retrofit 1001 & 1002

Reinforcing
Plates



Current Design



Spade Latch



The Future of Towed Cannon Artillery

Early Shoot-Off Design

- Displacement Time (KPP) Not Met
- No Latches for Spade Separation

Initial EMD Design

- Displacement Time Met: With Latch
- But...Latch Not Robust
 - Ski Boot Design
 - Failed Initial Contractor Testing

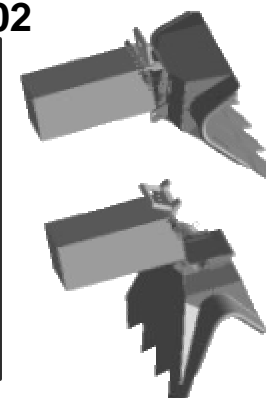


Final EMD Design

- Improved Displacement Time
- Robust Latch: Extensive FEA
- Staff NCO Put On Design Team
 - Sand/ Grit/ Moisture Seals
 - Spring Loaded
 - Easier Operation
- Delivered on 1003 – 1010
 - Retrofit 1001 & 1002



Current Design

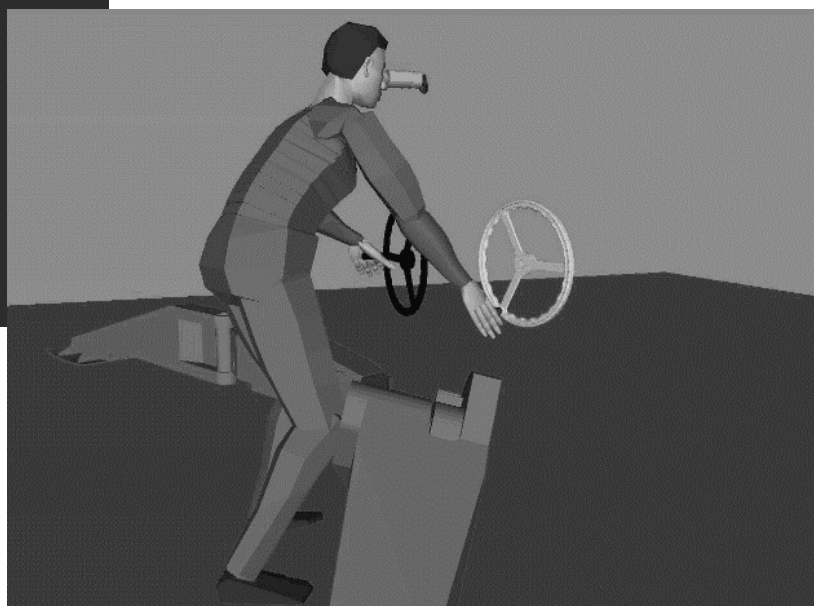
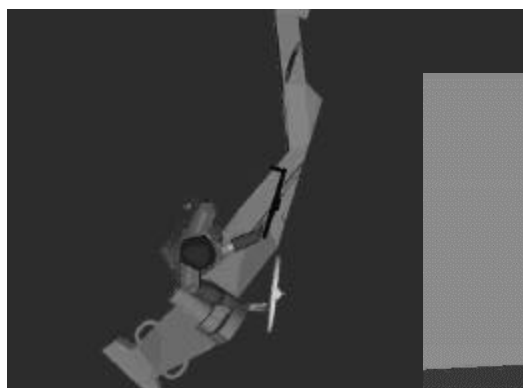




Computer Modeling

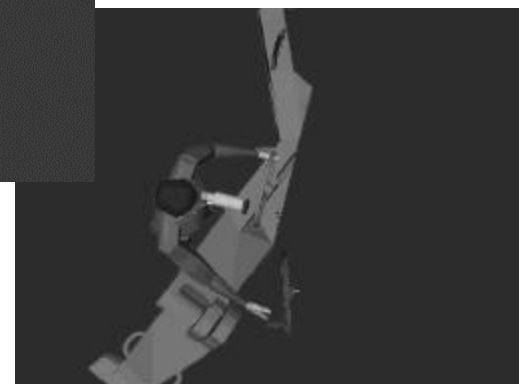


The Future of Towed Cannon Artillery



Human Factors Computer Modeling:

- Predict Crew Task Times
- Improve the Weapon Design





EMD Howitzer Deliveries



The Future of Towed Cannon Artillery

Gun 1001

■ Testing at YPG Since July 00

Gun 1002

■ Testing at APG Started May 01

Future Deliveries

<u>Gun</u>	<u>Date</u>
1003	29 Jun
1004	07 Jul
1005-8	10 Dec

**On Track for
Milestone III in September 02**





Testing



The Future of Towed Cannon Artillery

Gun 1001 (Yuma Proving Ground)

- ✓ HFE Validation
- ✓ Firing Tables
- Initial TAD Component Firings
- Strategic Lift
- Helo Lift
- Artic Evaluation (Ft Greely, AL)
- Hot/Humid (Eglin AFB, FL)



863 Rounds Fired with No System Abort!

Gun 1003 (Yuma Proving Ground)

- Firing Tests
- Extreme Temperature
- NBC Decon. (Dugway, UT)
- Endurance Firing
- Safety Release



Gun 1002 (Aberdeen Proving Ground)

- Automotive Certification Testing
- Rail Impact
- Corrosion Test



Gun 1004 (Twenty-Nine Palms)

- Logistics Demonstration
- Verify Manuals
 - Operator
 - Maintenance
- Verify Training Materials



Guns 1005 - 1008 to 29 Palms, California for Multi-Service Operational Testing



LW155 Team



The Future of Towed Cannon Artillery

GENERAL DYNAMICS
Strength on Your Side™

Digital Fire Control
General Dynamics
Burlington, VT



Cannon Assembly
Watervliet Arsenal
Watervliet, NY

BAE SYSTEMS

Prime Contractor & Developer,
Cradle Assembly
Barrow-in-Furness, England



Titanium
RTI International Metals
Niles, OH



Body Assembly
Hydro-Mill
Chatsworth, CA



Breech Operating &
Loading Tray System
Rock Island Arsenal
Rock Island, IL

United Defense

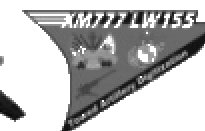
US Integrator &
Final Assembly
United Defense
Pascagoula, MS



Spades & Stabilizers
Major Tool & Machine Inc.
Indianapolis, IN



Elevating Gear
Wegmann USA
Lynchburg, VA



Program Management
JPMO LW155
Picatinny Arsenal, NJ

Towed Artillery Digitization

Navigator



**Digital Direct
Fire Sight**



Displays



Radio



**Muzzle Velocity
System (MVS)**



Ballistic Computer



**Enhanced Power Supply
Distribution Unit**



The 155mm Technology Demonstrator

XVIII Airborne Corps Artillery
Training for RFPI Field Experiment

*Digitization Comes
to Towed Artillery*



C Btry, 1st Bn, 377th FA
Extended User Evaluation

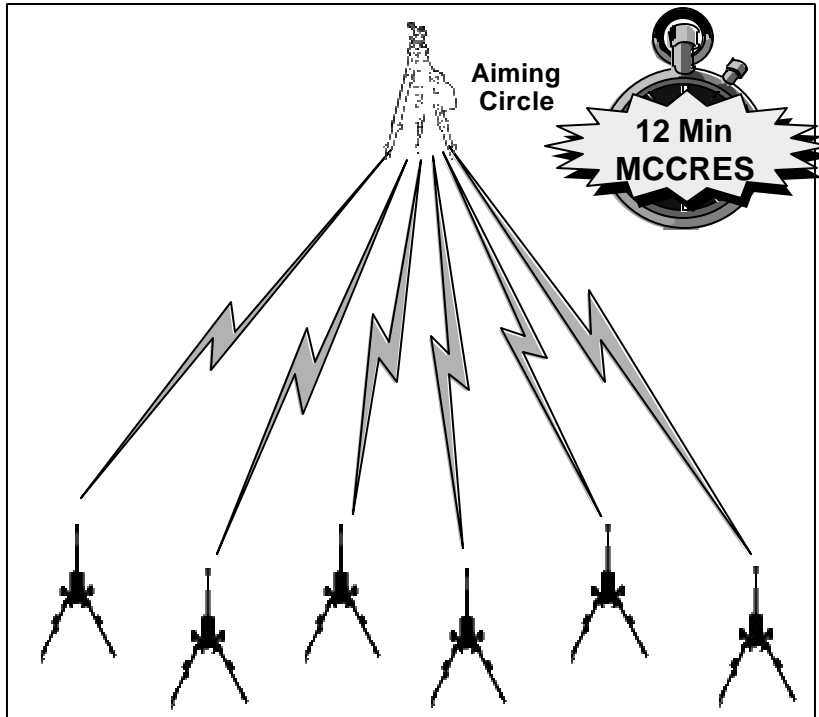
Notes from C Btry 1-377 FA Cdr on his unit's last Joint Readiness Training Center (JRTC) rotation.

"The 1st platoon conducted a 40 mile road march with the Towed Weapon Inertial Navigation System (part of the RFPI navigation system) to a position area for a live fire. We completed all missions without survey. The platoon was laid and safe in less than 3 minutes. The MTP 6-037-30-MTP standard is 10 minutes for a platoon (Task #6-3-42300)."

"In the force on force mission, we occupied a battery position area with the guns being laid and safe in less than 5 minutes. The MTP standard for this is 13 minutes."

Faster Emplacement

Today



Problems

- ✓ Glass & Iron... Survey Required
- ✓ Slow Emplacement... Aiming Circle

LW155



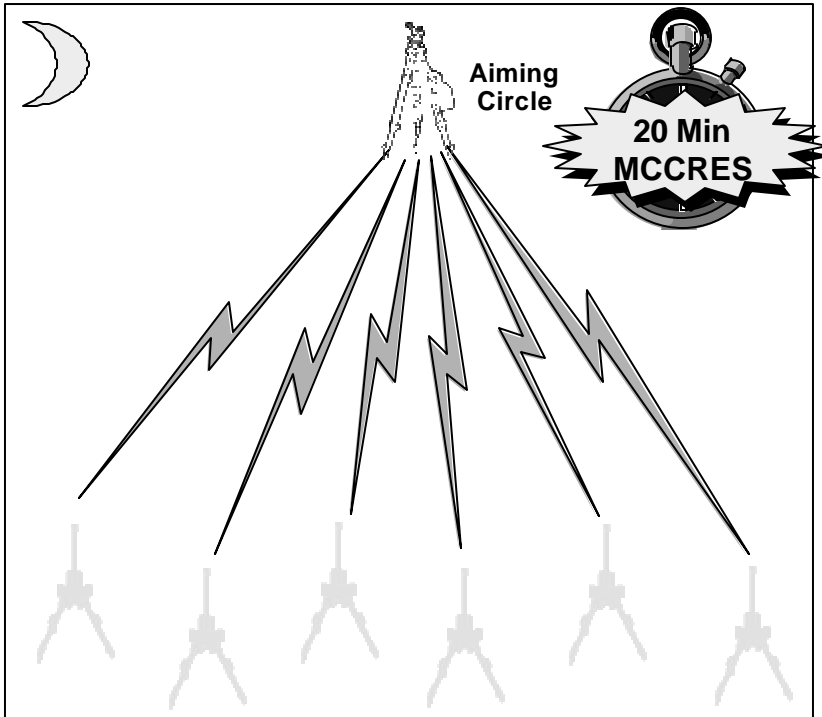
Towed Artillery Digitization

- ✓ No Survey Party Required
- ✓ 8.5 Min Faster than MCCRES



Much Faster Night Emplacement

Today



Problems

- ✓ Glass & Iron... Survey Required
- ✓ Slow Night Emplacement... Aiming Circle

LW155



Towed Artillery Digitization

- ✓ No Survey Party Required
- ✓ 16.5 Min Faster than MCCRES



39 Round
▲ Per Gun



TAD Capability



The Future of Towed Cannon Artillery

Aiming & Pointing System
Navigation
On-Board Radio
On-Board Power Supply
 Batteries (Li-Ion)
 Recharging System
Gunner's Display
Asst. Gunner's Display
Chief's Display (Paladin "Look")
Advanced Direct Fire Sight (Stand alone)
 Integrated w/Mission Computer
Mission Computer
 Hardware (objective)
 Ballistics (NABK) (Paladin)
 JVMF (AFATDS) Messaging (Paladin)
 Muzzle Velocity Sensor Integrated
Prime Mover Modifications
Embedded Training (Paladin-Generic)
Gunner's Display Unit Emulation

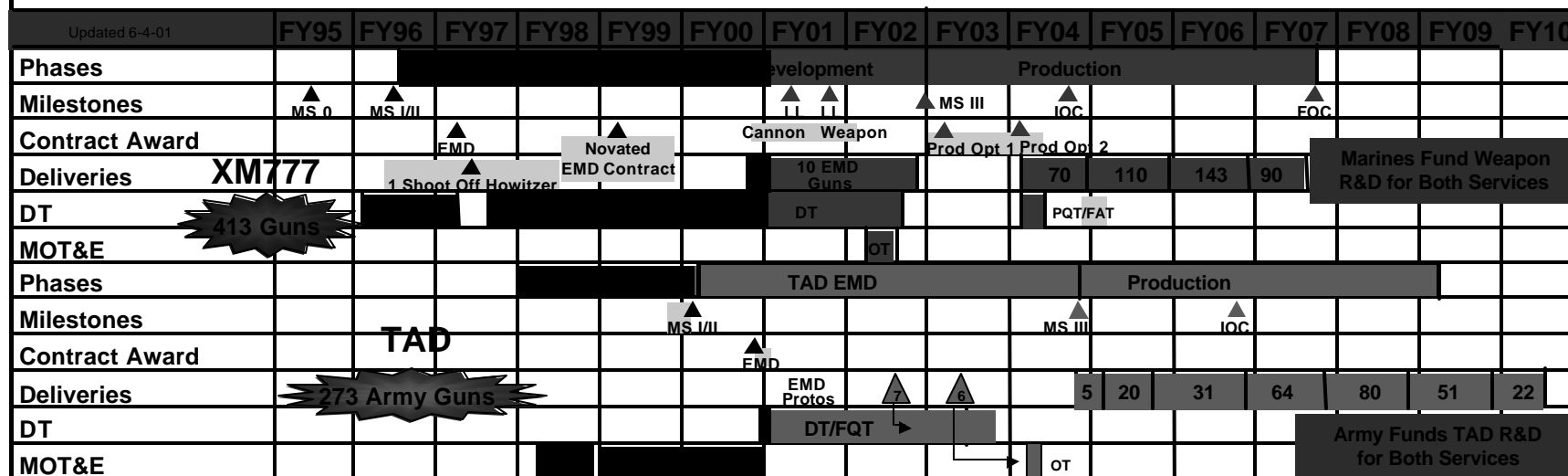
- ✓ Initial Operating Capability in FY 06
- ✓ Funded
- ✓ General Dynamics On Board



Integrated Program Schedule



The Future of Towed Cannon Artillery



Lightweight 155mm Howitzer



- XM777 Replaces M198
- TAD Paladinizes Towed 155's
- IBCT Artillery

Lightweight 155mm Howitzer



- XM777 Replaces M198
- TAD Paladinizes Towed 155's
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